

What is Claimed is:

- 1 1. A method for detecting an endpoint of a chemical mechanical polishing (CMP)
2 process comprising:
3 (a) setting up at least one carrier for fixing a wafer comprised of a plurality of
4 material layers to a surface of a polishing pad;
5 (b) rotating the wafer and the polishing pad with respect to each other, and causing
6 the wafer to move from a first portion of the polishing pad to a second portion;
7 (c) measuring one environmental temperature by a measuring device;
8 (d) measuring one temperature of the portion of the polishing pad by the measuring
9 device;
10 (e) calculating a temperature difference between the temperature in step (c)-(d);
11 (f) repeating step(b)-(e),and making a curve which includes a first constant value
12 slope, a non-constant value slope, a second constant value slope; and
13 (g) determining an endpoint of the CMP process by a turning point between the first
14 constant value slope and the second constant value slope.
- 1 2. The method of claim 1, wherein in said step (c)-(d) the measuring device is a single
2 point temperature measuring device.
- 1 3. The method of claim 1, wherein in said step (c)-(d) the measuring device is a thermal
2 image camera.
- 1 4. The method of claim 2, wherein said single point temperature measuring device is an
2 infrared detection device.
- 1 5. The method of claim 1, wherein in said step (c) the environmental temperature at the

2 central portion of the polishing pad.

1 6. The method of claim 1, wherein in said step (c) the environmental temperature at the
2 edge portion of the polishing pad.

3 7. The method of claim 1, wherein in said step (c) the environmental temperature at any
4 portion of the CMP apparatus in addition to the rotary polishing platen.

1 8. The method of claim 1, wherein in said step (c) the environmental temperature at any
2 portion of the stable temperature in the environment.

1 9. The method of claim 1, wherein said step (c)-(g) use an operation device.

1 10. The method of claim 9, wherein said operation device is built-in the measuring device
2 or linked.

1 11. The method of claim 9, wherein said operation device is linked to a computer.

1 12. The method of claim 1, wherein said step (f) uses a numerical method.

1 13. The method of claim 12, wherein said numerical method is the least square method or
2 other linear regression methods.

1 14. The method of claim 12, wherein said numerical method is linear regression methods.

1 15. The method of claim 1, wherein in said step (f) the first constant value slope and the
2 second constant value slope is in a predetermined variation.

1 16. The method of claim 15, wherein said predetermined variation is within five percent.